

THURSDAY, JUNE 1, 1905.

PUBLIC HEALTH AND SEWAGE  
PURIFICATION.

*Sanitary Law and Practice.* A Handbook for Students. By W. Robertson, M.D. (Glas.), D.P.H., and Charles Porter, M.D., B.Sc. (Public Health), M.R.C.P. Edin. Pp. xiii+756. (London: Sanitary Publishing Co., Ltd., 1905.) Price 10s. 6d. net.

*The Sewage Problem.* A Review of the Evidence Collected by the Royal Commission on Sewage Disposal. By Arthur J. Martin, Assoc.M.Inst.C.E., M.R.San.I. Pp. xvi+363. (London: Sanitary Publishing Co., Ltd.) Price 8s. 6d. net.

*Simple Methods of Testing Sewage Effluents.* For Works Managers, Surveyors, &c. By George Thudicum, F.I.C. Pp. 60. (London: Sanitary Publishing Co., Ltd., n.d.) Price 2s. 6d. net.

THE official responsibility for the safeguarding of the public health rests mainly with the representatives of four professions, viz. the medical officer, with his colleague the sanitary inspector, the bacteriologist, the engineer, and the chemist. A study of the volumes under review has strengthened the belief that it is desirable that members of each profession, while working cordially together for a common end, should severally recognise their respective limitations.

The text-book on "Sanitary Law and Practice" by Drs. Robertson and Porter is written in sections, each section referring to some special branch of public health work. A considerable portion of each section is occupied by a digest of the legal enactments affecting the subject, this being followed by paragraphs dealing, by description and advice, with the practical duties of the health officer. The condensation of legal information, so far as can be estimated by references to special points coming under the experience of the reviewer, is done with judgment, and constitutes a feature of the book, of great value alike to the student and to the practitioner.

Many useful hints from the wide experience of the authors are to be found in the descriptive portions of the book. Their experience, however, is naturally not all-embracing, and it is not difficult to note where their information is derived from the statements of others.

The subject of destructors, although coming within the province of the engineer, is evidently one with which the authors are familiar. The descriptions are clearly written, and the essential points in construction, choice of site, and proper management well brought out.

In the section on food and drugs no attempt is made to instruct the medical officer in duties which properly belong to the public analyst. This is satisfactory in view of the attempt frequently made by small authorities to combine the offices of public analyst and medical officer. Even in such a comparatively simple matter as the analysis of a sample of water, which in the chapter on water supply (p. 433) is referred to as part of the medical officer's

duties, unsuspected pitfalls may lurk. It is doubtful whether bacteriological examinations should ever be undertaken by any but a trained bacteriologist, at any rate where identification of a given species is required.

In the section on disinfection a questionable prominence is given to the use of sulphur. The authors themselves, in a later paragraph, deprecate the use of superheated steam as being "no better than a gas," and in view of the obvious disadvantages in the use of sulphur, which have given rise to serious complaint of destruction of fabrics and fittings, especially on board ship, it can hardly be compared with liquid disinfectants such as formalin. No reference is made to the use of hypochlorites, which in certain circumstances have been found to give excellent results.

A wise reserve is maintained on the vexed question of sewer ventilation, a qualified approval being given to upcast shafts. It is unfortunate that a similar reserve has not been exercised in the chapter on sewage purification. In a book intended for students it is unwise to select, even for description, any form of patented appliance which is not thoroughly established. The choice for special commendation of one particular patented apparatus, concerning the merits of which competent opinion can at least be said to be divided, is certainly to be deprecated. A clear exposition of general principles of sewage treatment would have been more valuable.

This leads to the consideration of the able condensation of the bulky volumes of evidence given before the Royal Commission on Sewage Disposal which is to be found in Mr. Martin's book on the "Sewage Problem." Mr. Martin has provided a book which will be eagerly sought after by members of sewage committees and others who are appalled at the mass of matter in the numerous blue-books published by the commission. He is to be congratulated upon the impartial way in which he has marshalled the evidence. Possibly because of this impartiality the impression left upon the reader is that in spite of the great amount of work that has been done on the subject, sewage purification is still rather an art than a science.

The Royal Commission has been criticised for the slowness of its methods. A more just criticism would be that it might have devoted more energy to questions affecting the theory of the processes in use. As it is, a mass of empirical and sometimes conflicting information has been accumulated, from which it is extremely difficult to extract underlying certainties. While fully realising that a large part of the sewage problem is concerned with purely practical questions of cost and local conditions, yet ultimately the economic solution must depend on a full knowledge of the changes taking place in the course of various methods of treatment; and these are as yet by no means perfectly understood. It is curious, e.g., that no witness deals in any detail with the purely physical effects produced by contact with the filtering medium, although many observers, especially on the Continent, believe that these play a very large part in connection with the changes produced. It is by no means

certain even yet, that anaërobie action is absolutely necessary at any stage of sewage purification. Many other equally important questions might be instanced on which knowledge is still extremely limited.

The outstanding result of the Royal Commission's labours which will most appeal to local authorities is the statement that adequate purification can be effected without land treatment, which, if recognised by the Local Government Board, will remove what is, in many cases, an impossible restriction. Their recommendation in regard to a central controlling and advisory authority, if resulting in the creation of a department similar to the Massachusetts Board of Health, may prevent great waste of public money. Such a board might exercise wise discretion as to the amount of purification necessary under given conditions. No central control, however, can be effective without efficient local management, and Mr. Thudicum's little book of simple methods of sewage analysis will be of great assistance to local engineers and intelligent works managers, and will help to lighten the work of the trained specialist, with whom the solution of difficulties ultimately rests. G. J. F.

#### AN AMERICAN CONTRIBUTION TO IRCHÆOLOGY.

*University of Pennsylvania: Transactions of the Department of Archaeology: Free Museum of Science and Art. Vol. i. Parts i. and ii. Pp. 125. (Published by the Department of Archæology, 1904.)*

THE most important article in this volume is the description of the American excavations at Gournià, in Crete, which have already been referred to in the pages of NATURE (September 15, 1904, p. 482). Miss Harriet A. Boyd, the leader of the expedition, gives a full and very interesting description of her work, illustrated by photographs which give the reader a very good idea of the beautiful scenery of the Gulf of Mirabello (well bestowed name!), on the shores of which she found her work. No more delightful spot for archæological exploration could be imagined. Leaving the rather arid and uninteresting Candiotte shore, near which Knossos lies, dominated by the towering hill of Iuktas, on the top of which, so legend says, the god Zeus died and was buried, the traveller skirts the base of the Lasithiote mountain-mass and reaches the narrow isthmus of Hierápetra (the ancient Hierapytna). Before him rises a magnificent rocky wall of mountain, Thriphte by name, behind which is the peak called the Aphendi, or Lord of Kavóusi, the village which lies at its foot. This wall is rent by a mighty cleft, the chasm of Thriphte, which is one of the dominating features of the landscape. Along the base of the wall runs the high-road from Kavóusi to Hierápetra across the isthmus, which is low-lying land, forming a complete break in the mountain-backbone of Crete. On the northern shore of the isthmus is a good beach, Pachyammos ("Deep-sand") by name; in the centre of it the traveller will see a large white house.

This was Miss Boyd's headquarters. All around are splendid mountains and "a coast-line as picturesque

as any in Southern Europe," to quote her description, which is not exaggerated; she might have said "more picturesque than," with reason. Away to the left are the snowy heights of Lasithi, the hills above the *skála* or landing-place of Ayios Nikólas, and distant rocky Spinalonga, still the home of a peculiar race of Mohammedan fishermen—corsairs not so very long ago. To the right is the little isle of Psyrà, swimming in the blue water. One would think that the excavators on the monotonous plains of Babylonia, whose doings are chronicled by Prof. Hilprecht in the last contribution to this volume,<sup>1</sup> would have given much sometimes to have been able to transport themselves for a brief space to such goodly surroundings!

Pachyammos lies a mile or so beyond, and east of, the scene of Miss Boyd's work, the low hill of Gournià, on which she has discovered the remains of a "Mycenæan," or more correctly "Minoan," town, a Bronze age settlement. It is a small Pompeii. One can walk up the sinuously curving little main street and look right and left into the ruined houses of the Bronze age "Minoans." There is even a sort of court-house or "palace," to give it the stereotyped appellation, with its right-angle of low steps quite on the model of the splendid right-angled stairways of Knossos and Phaistos, which Dr. Evans considers to have been theatres, the prototypes of the stepped Greek theatres of the classical period. This "palace" must have been the official centre of the town. Formerly, judging from classical analogies, one talked of a prince or "dynast" ruling from every one of these little palaces over his own little *πόλις* or city-state; but it will probably eventually be found that the ruler who lived in such a "palace" as that of Gournià was no more than a mere mayor or demarch, a member of an official bureaucracy analogous to that of ancient Egypt, dependent upon the metropolitan authorities at Knossos. It becomes more and more probable that Crete in Minoan days was a homogeneous and highly organised State like Egypt, not a mere congeries of a hundred warring villages, as in classical times.

The official centre was not the religious centre of the town. The cathedral of Gournià stood in the middle of the town, and was approached by a special street of its own.

"Not imposing as a piece of architecture," writes Miss Boyd (p. 41), "it is yet of unique importance as being the first 'Mycenæan' or 'Minoan' shrine discovered intact. The worshipper ascended three steps and through a doorway 1.50 m. wide entered an enclosure, about 3 m. square, surrounded by walls half a metre thick and 50 to 60 cm. high. The floor is of beaten earth."

The more noteworthy of its contents are

"a low earthen table, covered with a thin coating of plaster, which stands on three legs and possibly served as an altar, four cultus vases bearing symbols of Minoan worship, the disc, consecrated horns and double-headed axe of Zeus, a terra-cotta female idol entwined with a snake, two heads of the same type as

<sup>1</sup> Very curiously described as "A Lecture delivered before German Court and University Circles, by H. V. Hilprecht." In it Prof. Hilprecht tells us little or nothing about the excavations at Nippur that has not already appeared in his "Explorations in Bible Lands," and the photographs published are already well known to archæologists.